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10/730,156

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Andrew J. Olsen

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EXAMINER

WAKS, JOSEPH

ART UNIT

PAPER NUMBER

2834

DATE MAILED: 08/31/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/730,156

Applicant(s)

OLSEN ET AL.

Examiner

Joseph Waks

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 December 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-41 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9, 16-20, 27-33, 40 and 41 is/are rejected.
- 7) ☒ Claim(s) 10-15, 21-26, 34 and 36-39 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>0504</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 2 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In line 2, “a second housing” is confusing since claim 1 already recites the second housing as being included with the generator.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 4-8, 30, 31 and 41 are rejected under 35 U.S.C. 102(b) as being anticipated by Birch et al. (US 5,261,289).

Birch et al. disclose invention as claimed: a turbine including a first housing 10a and a first rotor (not shown), a generator including a second housing 21 and a generator rotor (not shown), the generator rotor supported for low-speed rotation by a low-speed bearing 18, a gearbox including a third housing 10c connected to the first housing and the second housing, a pinion gear 11, and a low-speed, ring gear 13 connected to the generator rotor and supported by the low-speed bearing, a shaft 14 connected to the first

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rotor and the pinion gear, and a first high-speed bearing 15 and a second high-speed bearing 16 positioned to support the first rotor and the shaft for high-speed rotation, the ring gear being driven by a plurality of gears 12a-12d driven by the high speed gear 11.

Regarding claim 4, in column 3, lines 61-63, Birch et al. disclose the high speed shaft of 50,000 rpm being reduced to 3,000 rpm for the low speed shafts that are in the ranges disclosed by applicants.

Re claims 30, 31, and 41, Birch et al. disclose the structure as claimed. Claims 30 and 31 that merely recite connecting and using the disclosed features together is inherent to the disclosed structure.

5. Claims 1, 2, 30, 31 and 41 are rejected under 35 U.S.C. 102(b) as being anticipated by Gordon et al. (US 6,073,857).

Gordon et al. disclose invention as claimed: a turbine 22 including a first housing and a first rotor, a generator 28b including a second housing 28 and a generator rotor, the generator rotor supported for low-speed rotation by low-speed bearings, a gearbox 26 including a third housing connected to the first housing and the second housing, a pinion gear 64, and a low-speed gear 66 connected to the generator rotor and supported by the low-speed bearing, a shaft 24 connected to the first rotor and the pinion gear, and a first high-speed bearing 96, a second high-speed bearing 116 positioned to support the first rotor and the shaft for high-speed rotation, and a compressor 18 connected to the first rotor and having a compressor housing.

Regarding claim 4, Gordon et al. sets the operating range of the turbine between 30,000 (column 7, line 46) and 125,000 rpm (column 4, line 41). With final drive ratio of 15:1 (column 5, line 42) the output velocity range may be 2,000-8,333 rpm. This ranges

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include the applicant's claimed at least 15,000 rpm for the high-speed rotor and less than 4,000 rpm for the low speed motor.

Re claims 30, 31 and 41, Gordon et al. disclose the structure as claimed.

Claims 30 and 31 that merely recite connecting and using the disclosed features together are inherent to the disclosed structure.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 3 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Birch et al. (US 5,261,289) or Gordon et al. (US 6,073,857).

Both Birch et al. and Gordon et al. disclose the claimed invention except for synchronous generator. It would have been obvious to one having ordinary skill in the art at the time the invention was made to select the gear ratio for 3,000 or 3,600 rpm for service with a 50Hz or 60Hz system as required by synchronous type of generator, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Re claim 40, both Gordon et al. Birch et al. and disclose the structure as claimed. Claim 40 that merely recites connecting and using the disclosed features together are inherent to the disclosed structure.

8. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gordon et al. (US 6,073,857) in view of Profant et al. (GB 2078338A) and.

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Gordon et al. disclose the turbine system essentially as claimed. However, Gordon et al. do not disclose the shaft being a quill shaft.

Profant et al. disclose a quill shaft for a high speed gas turbine for the purpose of creating a shaft having high modulus to density ratio resulting in increase stiffness and higher critical speed, thus eliminating the need for an additional bearing support.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to design the system as taught by Gordon et al. and to provide the quill shaft as taught by Profant et al. For the purpose of creating a shaft having high modulus to density ratio resulting in increase stiffness and higher critical speed, thus eliminating the need for an additional bearing support.

9. Claims 16, 32 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gordon et al. (US 6,073,857) in view of Brooks et al. (US 5,526,640).

Gordon et al. disclose the turbine system essentially as claimed. However, Gordon et al. do not disclose the tie-bolt passing through at least a portion of the rotor flange, the turbine shaft, and the entire compressor shaft to engage the turbine shaft and the rotor flange to couple the turbine shaft, the compressor shaft and the rotor flange.

Brooks et al. disclose the tie-bolt 32 passing through the rotor flange, the turbine shaft, and the entire compressor shaft for the purpose of engaging the turbine shaft and the rotor flange to couple the turbine shaft, the compressor shaft and the rotor flange.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to design the system as taught by Gordon et al. and to provide the tie-bolt passing through at least a portion of the rotor flange, the turbine shaft, and the entire compressor as taught by Brooks et al., for the purpose of engaging the turbine shaft

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and the rotor flange to couple the turbine shaft, the compressor shaft and the rotor flange, thus facilitating the assembling and disassembling of the gas compressor unit.

Re claims 32 and 33, the combined structure includes all elements as claimed.

Claims 32 and 33 that merely recite connecting and using the disclosed features together are inherent to the disclosed structure.

10. Claim 17-20, 28 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gordon et al. (US 6,073,857) in view of Profant et al. (GB 2078338A) and Birch et al. (US 5,261,289).

Gordon et al. disclose the turbine system essentially as claimed. However, Gordon et al. do not disclose the shaft being a quill shaft and the ring gear connected to the generator.

Profant et al. disclose a quill shaft for a high speed gas turbine for the purpose of creating a shaft having high modulus to density ratio resulting in increase stiffness and higher critical speed, thus eliminating the need for an additional bearing support.

Birch et al. disclose a cup-shaped ring gear connected to the generator in for the purpose of providing planetary gears that overlap in axial direction of the pin, thus reducing the overall diameter of the gearbox.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to design the system as taught by Gordon et al. and to provide the quill shaft as taught by Profant et al. for the purpose of creating a shaft having high modulus to density ratio resulting in increase stiffness and higher critical speed, thus eliminating the need for an additional bearing support.

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It would have been further obvious to one having ordinary skill in the art at the time the invention was made to design the combined system and to provide the ring gear connected to the generator as taught by Birch et al. for the purpose of providing planetary gears that overlap in axial direction of the pin, thus reducing the overall diameter of the gearbox.

Regarding claim 18, Gordon et al. sets the operating range of the turbine between 30,000 (column 7, line 46) and 125,000 rpm (column 4, line 41). With final drive ratio of 15:1 (column 5, line 42) the output velocity range may be 2,000-8,333 rpm. This ranges include the applicant's claimed at least 15,000 rpm for the high-speed rotor and less than 4,000 rpm for the low speed motor.

11. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gordon et al. (US 6,073,857) in view of Profant et al. (GB 2078338A) and Birch et al. (US 5,261,289) as applied to claim 17 above and further in view of Brooks et al. (US 5,526,640).

The combined turbine system includes all elements essentially as claimed. However, it does not disclose the tie-bolt passing through at least a portion of the rotor flange, the turbine shaft, and the entire compressor shaft to engage the turbine shaft and the rotor flange to couple the turbine shaft, the compressor shaft and the rotor flange.

Brooks et al. disclose the tie-bolt 32 passing through the rotor flange, the turbine shaft, and the entire compressor shaft for the purpose of engaging the turbine shaft and the rotor flange to couple the turbine shaft, the compressor shaft and the rotor flange.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to design the system as taught by Gordon et al. and to provide the

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tie-bolt passing through at least a portion of the rotor flange, the turbine shaft, and the entire compressor as taught by Brooks et al., for the purpose of engaging the turbine shaft and the rotor flange to couple the turbine shaft, the compressor shaft and the rotor flange, thus facilitating the assembling and disassembling of the gas compressor unit.

Allowable Subject Matter

12. Claims 10-15, 21-26, 34 and 36-39 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Re claims 10, 11, 21, 22, 34 and 36-39, the feature of the diaphragm portion that allows for relative movement between the first rotor and the pinion gear, in combination with the other limitations present, are neither disclosed nor taught by the prior art of record.

Re claims 12-15 and 23-26, the feature of the plurality of the coupling members sized to shear when a torque level generated by engine operation exceeds a predetermined value, in combination with the other limitations present, are neither disclosed nor taught by the prior art of record.

Prior Art

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph Waks whose telephone number is (571) 272-2037. The examiner can normally be reached on Monday through Thursday 8 am to 5 pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Darren E Schuberg can be reached on (571) 272-2044. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Joseph Waks
Primary Examiner
Art Unit 2834

8/27/04